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FINAL
PHASE II DATA ADDENDUM
SITE 3-4
NEMAGON SPILL AREA
VERSION 3.1

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October 1988
Contract No. DAAK11-84-D-0017
TASK NO. 20 - Lower Lakes

EBASCO SERVICES INCORPORATED

R. L. Stollar and Associates
California Analytical Laboratories, Inc.
DataChem, Inc. Geraghty & Miller, Inc.

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LITIGATION TECHNICAL SUPPORT AND SERVICES
ROCKY MOUNTAIN ARSENAL

FINAL
PHASE II DATA ADDENDUM
SITE 3-4
NEMAGON SPILL AREA
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Prepared by:

EBASCO SERVICES INCORPORATED
R.L. STOLLAR AND ASSOCIATES
CALIFORNIA ANALYTICAL LABORATORIES, INC.
DATACHEM, INC. GERAGHTY & MILLER, INC.

Prepared for:

U.S. ARMY PROGRAM MANAGER'S OFFICE FOR
ROCKY MOUNTAIN ARSENAL CONTAMINATION CLEANUP

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1.0 PHASE II PROGRAM

Due to the detection of benzene, carbon tetrachloride, tetrachloroethylene, and a number of tentatively identified nontarget compounds at Site 3-4 during the Phase I contamination assessment, and the discovery of detectable levels of dibromochloropropane during the PETREX soil gas program (Ebasco, 1988/RIC 88076R04), a Phase II program was initiated at Site 3-4 in the spring of 1988. The Phase II program was generally conducted as presented in the Phase I Contamination Assessment Report (CAR). Boring locations, depths, and number of samples were as planned in the Phase I program, except at Borings 31, 33, 34, and 37 where poor recovery after the 0 to 1 feet (ft) sample was collected necessitated that the borings be relocated in order to enable the collection of samples at deeper intervals. Boring 31 was moved 0.3 ft south and Borings 33 and 34 each were moved 0.5 ft south so that the 4 to 5 ft intervals could be sampled. The 2 to 3 ft sample for Boring 37 was collected at a location 0.5 north of the original borehole. A total of ten borings, three to 3 ft, four to 5 ft, and three to 8 ft, were drilled and sampled, yielding 23 samples.

Prior to any Phase II drilling, the Program Manager's Office, Ebasco, Morrison-Knudsen Engineers (MKE), and R.L. Stollar and Associates formulated procedures for MKE to obtain subsamples from selected soil cores during Phase II drilling. MKE did not subsample any borings for Site 4-3.

Analytes and analytical methods were generally as planned in the Phase I program. Selected samples (see Table 3-4-II-2, Section 4.0 of this report) were analyzed by gas chromatography/electron capture detector (GCECD) for dibromochloropropane (8 samples), by gas chromatography/mass spectrometry (GC/MS) for semivolatile target organics (6 samples), by gas chromatography/photoionization detector (GC/PID) for volatile aromatic organic compounds (9 samples), and gas chromatography/conductivity detector (GCCON) for volatile halogenated organic compounds (9 samples). One sample was analyzed for volatile target organics by the GC/MS method. This method can also detect nontarget analytes. Gas chromatography/mass spectroscopy confirmation analysis was also requested for one of the samples (rather than

two, as originally planned). Appendix 3-4-II-A presents a complete list of all analytical methods and target analytes used in the Phase I and Phase II programs; methods and analytes were chosen from the list for use at this site.

2.0 PHASE II FIELD OBSERVATIONS

There were no appreciable changes at the site since the Phase I program was conducted in the fall of 1987. No new field observations were noted at the time of Phase II drilling.

In situ air monitoring was conducted during drilling operations for safety purposes using a photoionization detector (HNu) and an organic vapor analyzer (OVA). No OVA reading above background was detected, nor were any HNu readings recorded above background level. The results of the volatile organic readings down the borings at the sampled depths are presented in Table 3-4-II-2, Section 4.0 of this report.

The history of this site did not indicate a need for use of an M8 alarm or M18A2 test kit. No unexploded ordnance, buried metal, or other objects were detected during drilling. Drilling difficulties were encountered at all ten borings due to trains occupying and moving along the tracks, between which borings were to be drilled. No unusual coloring or staining of the core samples was noted.

3.0 GEOPHYSICAL EXPLORATION

No geophysical survey was conducted at Site 3-4 during Phase II drilling because historical data indicated that the presence of unexploded ordnance, buried metal, or any other object was highly unlikely.

4.0 PHASE II ANALYTE LEVELS AND DISTRIBUTION

The number of samples containing each analyte, the concentration range, median, mean, standard deviation, detection limit, and indicator level are listed in Table 3-4-II-1. The results of geologic field observations, air monitoring during drilling, and the chemical analysis of each soil sample are summarized in Table 3-4-II-2. Table 3-4-II-3 lists the boring number, sample interval depth, relative retention time (shown as "unknown number" on the

Table 3-4-II-1. Summary of Analytical Results for Site 3-4, Phase II. Page 1 of 1.

Constituent Detected	Number of Samples*	Range	Median**	Mean**	Concentration (ug/g)	DataChem		Indicator Level						
						Standard Deviation**	CAL Detection Limit							
<u>Volatile Organic Compounds (N=1)</u>														
None detected														
<u>Volatile Aromatic Organics (N=1)</u>														
None detected														
<u>Volatile Halogenated Organics (N=9)</u>														
None detected														
<u>Semi-volatile Organic Compounds (N=6)</u>														
Aldrin	1	2	-	-	-	0.3	0.3	DL						
Dieldrin	2	0.5-7	-	-	-	0.3	0.3	DL						
Dibromochloropropane	2	0.38-1.3	-	-	-	0.0050	0.014	DL						

DL - The indicator level is the detection limit for DataChem and CAL Laboratories, as appropriate

N - Number of samples analyzed

* - Number of samples in which constituent was detected; only these sample results were used in statistical analyses

** - Median, mean, and standard deviation not calculated when constituent detected in fewer than 5 samples

*** - Laboratory not certified for analytical method

Table 3-4-II-2. Results of Phase II Field Study. Page 1 of 3.

Depth (feet) Geologic Material	Boring 28				Boring 29				Boring 30			
	2-3 Sand w/Clay	4-5 Clayey Sand	7-8 Gravely Sand	2-3 Clayey Sand trace Gravel	4-5 Sand w/Clay	7-8 trace Gravel	2-3 Clayey Sand w/Gravel	4-5 Sand w/Gravel	7-8 Clayey Sand	4-5 Sand w/Gravel	7-8 Clayey Sand	
Percent Fines VO	10	15	0	10	20	10	30	0	30	0	35	
AIR MONITORING												
<u>Volatile Organic Readings (ppm)</u>	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
HNu*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
OVA*												
SOIL CHEMISTRY												
<u>Volatile Organic Compounds (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<u>Volatile Aromatic Organics (ug/g)</u>	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<u>Volatile Halogenated Organics (ug/g)</u>	BDL	BDL	BDL	BDL	**BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<u>Semivolatile Organics (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<u>Dibromoethane (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

BDL - Below detection limit

BKD - Background

NA - Not analyzed

VO - As determined by visual observations and rounded to the nearest 5 percent

* - As referenced to calibration standard of methane for OVA, and benzene for HNu; reading has been adjusted to account for background level

** - Phase II method confirmed by gas chromatography/mass spectrometry (GC/MS)

Table 3-4-II-2. Results of Phase II Field Study. Page 2 of 3.

Depth (feet)	Geologic Material			Boring 31			Boring 32			Boring 33			Boring 34		
	0-1 Sand	4-5 Clayey Sand	trace Gravel/ Clayey Sand	0-1 Sand	4-5 Sand	0-1 Sand w/Gravel	4-5 Sand	0-1 Sand w/Gravel	4-5 Sand	0-1 Sand w/Gravel/ Clayey Sand	4-5 Sand	0-1 Sand	4-5 Sand	0-1 Sand	4-5 Sand
Percent Fines VO	0/15	10	0	0	0	0	0	0	0	0	0	0/25	0	0	0
AIR MONITORING															
<u>Volatile Organic Readings (ppm)</u>	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
HNu*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
OVA*															
SOIL CHEMISTRY															
<u>Volatile Organic Compounds (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<u>Volatile Aromatic Organics (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<u>Volatile Halogenated Organics (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<u>Semi-volatile Organics (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<u>Ditromochloropropane (ug/g)</u>	1.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.38	BDL		

BDL - Below detection limit

BKD - Background

NA - Not analyzed

VO - As determined by visual observations and rounded to the nearest 5 percent

* - As referenced to calibration standard of methane for OVA, and benzene for HNu; reading has been adjusted to account for background level

11/3/88

Table 3-4-II-2. Results of Phase II Field Study. Page 3 of 3.

Depth (feet)	Boring 35			Boring 36			Boring 37		
	0-1 Sand	2-3 Clayey Sand	trace Gravel	0-1 Sand	2-3 Clayey Sand	trace Grav. & w/Silt	0-1 Sand	2-3 Clayey Sand w/Silt	
Percent Fines VO	0	20	0	30	0	0	0	25	
AIR MONITORING									
<u>Volatile Organic Readings (ppm)</u>	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	
HNu*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	
OVA*									
SOIL CHEMISTRY									
<u>Volatile Organic Compounds (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	
<u>Volatile Aromatic Organics (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	
<u>Volatile Halogenated Organics (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	
<u>Semivolatile Organics (ug/g)</u>	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Aldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Dieldrin									
<u>Dibromochloropropane (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA	

BDL - Below detection limit
 BKD - Background
 NA - Not analyzed

VO - As determined by visual observations and rounded to the nearest 5 percent
 * - As referenced to calibration standard of methane for OVA, and benzene for HNu; reading has been adjusted to account for background level

Table 3-4-11-3. Summary of Analytical Results for Site 3-4, Phase II. Page 1 of 1.

Constituent Detected	Number of Samples*	Range	Concentration (ug/g)			DataChem Standard Deviation**	CAL Detection Limit	Detection Limit	Indicator Level
			Median**	Mean**	Standard Deviation**				
Volatile Organic Compounds (N=1)									
None detected									
Volatile Aromatic Organics (N=9)									
None detected									
Volatile Halogenated Organics (N=9)									
None detected									
Semivolatile Organics (N=6)									
Aldrin	1	2	-	-	-	-	0.30	0.30	DL
Dieldrin	2	0.5-7	-	-	-	-	0.30	0.30	DL
Dibromochloropropane (N=8)	2	1.3-0.38	-	-	-	-	0.0050	0.0140	DL

DL - The indicator level is the detection limit for DataChem and CAL laboratories, as appropriate

N - Number of samples analyzed

* - Number of samples in which constituent was detected; only these sample results were used in statistical analyses

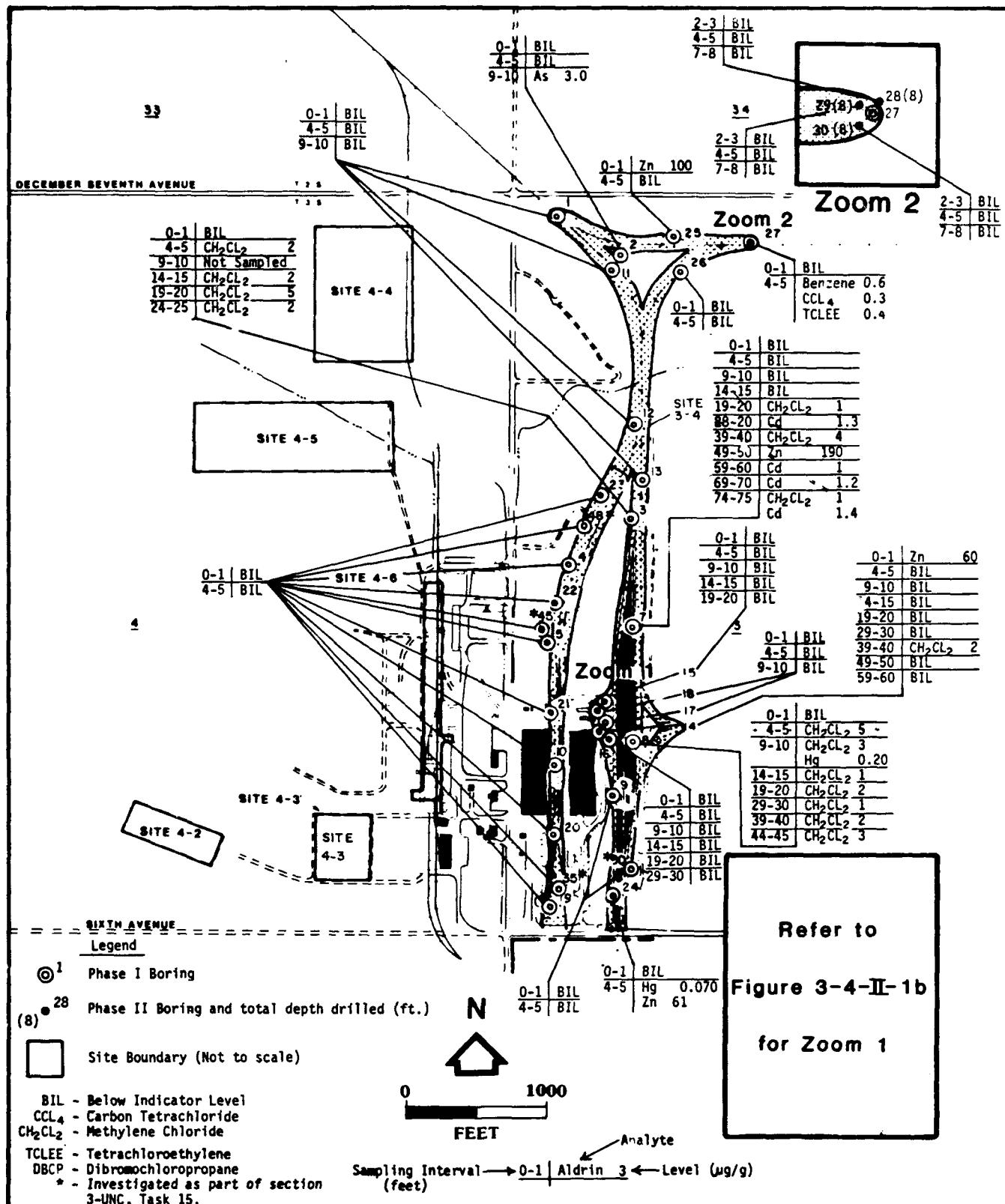
** - Medium, mean, and standard deviation not calculated when constituent detected in fewer than 5 samples

table), concentration, sample number, lot, best-fit identification, and comments for those nontarget compounds detected by GC/MS analysis of samples from Site 3-4. A tabulation of all analytical data associated with the Phase II program is presented in Appendix 3-4-II-B.

To assess the significance of the metal and organic analytical values, indicator ranges were established during the Phase I program. For organic compounds, the indicator level is the method detection limit. For metals, a range of values was chosen to reflect the upper end of the expected natural range for each metal as normally found in RMA alluvial soil. The procedure for establishing indicator ranges is presented in the Introduction to the Contamination Assessment Reports (ESE, 1987/RIC 88204R02).

Samples from the Phase II borings were analyzed for semivolatile and volatile target organics, volatile aromatic organics, volatile halogenated organics, and dibromochloropropane. Figures 3-4-II-1 and 1b, which show the locations of the borings as drilled, illustrates the analytes detected within or above their indicator levels. Aldrin, dieldrin, and dibromochloropropane were detected in the samples from Site 3-4 (Figures 3-4-II-1 and 1b). For purposes of comparison, the analytes detected within or above their indicator levels during the Phase I program are also presented in Figures 3-4-II-1 and 1b. At Site 3-4, both Phase I and Phase II programs used the same methods of analysis and detection limits for dibromochloropropane and volatile and semivolatile organics, so the resulting data are directly comparable; however, volatile aromatic and volatile halogenated organics were analyzed by more sensitive method in the Phase II program, enabling detection of these compounds at lower concentrations than by the GC/MS method. Low concentrations of the nontarget compounds, hexadecanoic acid and octadecene were tentatively identified in Borings 30, 35, 36, and 37 (Table 3-4-II-3). It should be noted that methylene chloride was also detected in the blanks at a concentration above its indicator level (2.0 ug/g for DataChem).

The data reporting procedures as described in the Laboratory Quality Assurance Plan, RMA (Ebasco, 1985/RIC 86241R02) required that all analyses on a sample be completed within the sample's respective holding time, and that analytical results be corrected for percent recovery and moisture content.



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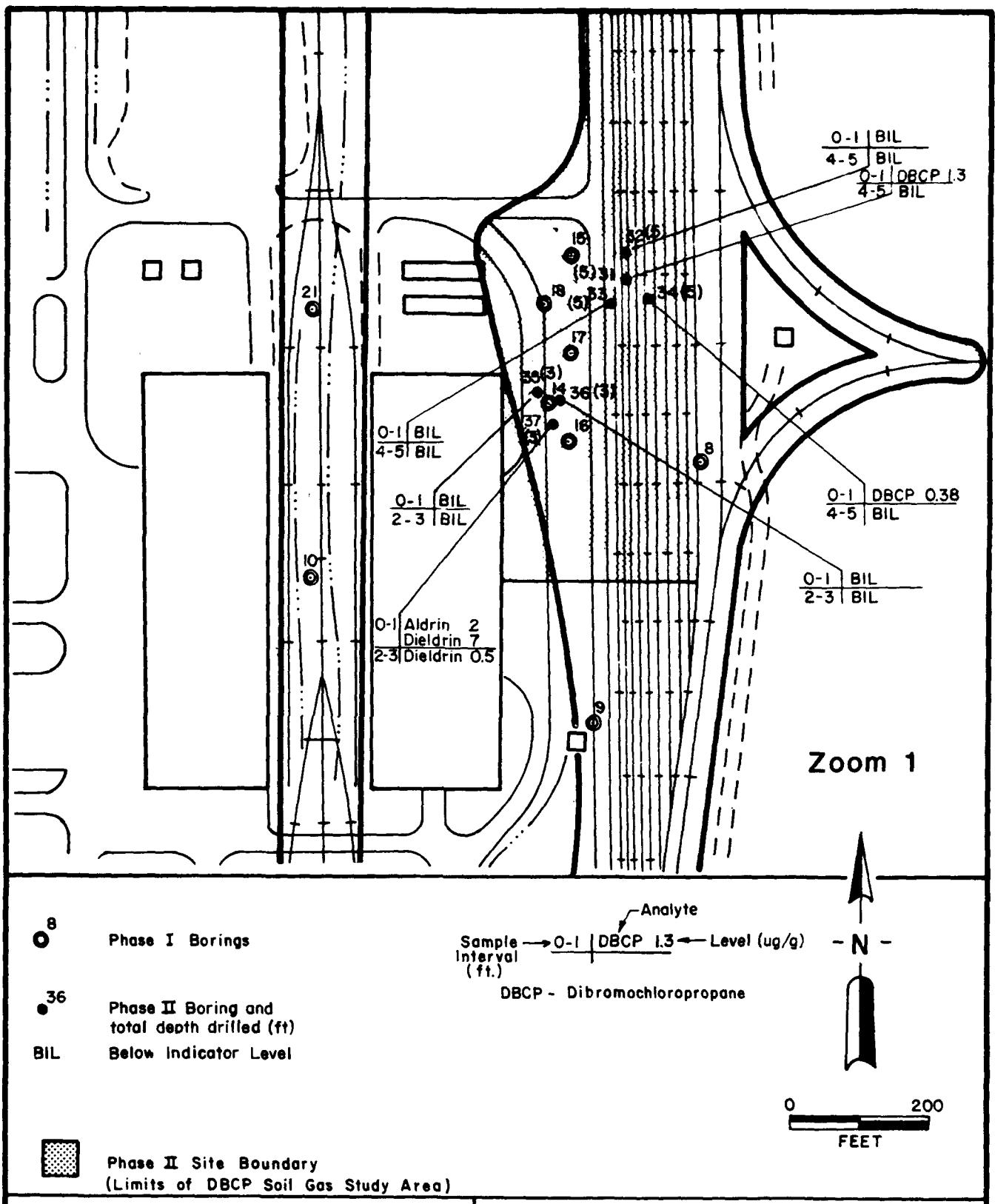
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Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 9/29/88

Figure 3-4-II-1
Phase I and Phase II
Analytes Detected Within or Above
Indicator Levels

Rocky Mountain Arsenal, Task 20

Prepared by Ebasco Services Incorporated



Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

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FIGURE 3-4-II-1b

**Phase I and Phase II
Analytes Detected Within or Above
Indicator Levels - Rail Line Area**

Rocky Mountain Arsenal, Task 20
Prepared by: Ebasco Services Incorporated

During routine sample analysis, analytical results must have either fallen within or have been diluted within the certified range, provided that holding times had not expired.

During laboratory certification, an analytical method was tested over a certain concentration range to determine the certified range. A typical tested concentration range would have been 0, 0.5x, 1.0x, 2.0x, 5.0x, and 10.0x, where x was the Target Reporting Limit (TRL). The Certified Reporting Limit (CRL) was determined by comparing the target and actual concentrations of the tested range. The upper certified range was the highest target concentration achieved.

If a sample analysis indicated that the sample was not diluted adequately to be within the certified range, the result was reported as greater than the upper certified range times any dilution factors. If a sample had exceeded its holding time and the result was greater than the certified range, the result was reported as greater than the upper certified range. If holding times were exceeded in attempting to dilute the sample until all results were within the certified range, results that were not identified above the certified range, but that may have been present at concentrations above the certified detection limit times the dilution factor.

The results of the Phase II sampling program at Site 3-4 are analyzed as part of the overall data analysis for the Western Study Area Report.

5.0 REFERENCES CITED

RIC 86241R02

Ebasco (Ebasco Services Incorporated). 1985, August. **Rocky Mountain Arsenal Procedures Manual to Technical Plan.** Contract No. DAAK11-84-D-0017.

RIC 88076R04

Ebasco. 1988, March. **Final Phase I Contamination Assessment Report; Site 3-4, Nemagon Spill Area, Version 3.2; Task 7.** Contract No. DAAK11-84-D-0017.

RIC 88204R02

ESE (Environmental Science and Engineering). 1987. **Introduction to the Contamination Assessment Reports.** RMA. Prepared for PMO for Rocky Mountain Arsenal Contamination Cleanup.

Appendix 3-4 - II-A

**Chemical Names
and
Abbreviations**

APPENDIX 3-4-II-A
Chemical Names and Abbreviations

<u>Analytic Methods</u>	<u>Abbreviations</u>
Atomic Absorption Spectroscopy	AA
Gas Chromatography/Conductivity Detector	GCCON
Gas Chromatography/Electron Capture Detector	GCECD
Gas Chromatography/Flame Ionization Detector	GCFID
Gas Chromatography/Flame Photometric Detector	GCFPD
Gas Chromatography/Mass Spectrometry	GCMS
Gas Chromatography/Nitrogen Phosphorous Detector	GCNPD
Gas Chromatography/Photoionization Detector	GCPID
High Performance Liquid Chromatography	HPLC
Inductive Coupled Argon Plasma Screen	ICP
Ion Chromatography	IONCHROM
Spectrophotometry	SPECT

PHASE I ANALYTES AND CERTIFIED METHODS
SOIL SAMPLES

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>AGENT PRODUCTS/HPLC</u>		
Chloroacetic acid	Chloroacetic acid	TDG
Thiodiglycol	Thiodiglycol (TDG)	CLC2A
		TDGCL
<u>AGENT PRODUCTS/IONCHROM</u>		
Isopropylmethylphosphonic acid	Isopropylmethylphosphonate	GBDP
		IMPA
<u>ANIONS/IONCHROM</u>		
Chloride	Chloride	ANIONS
Fluoride	Fluoride	CL
Sulfate	Sulfate	FL
		SO4
<u>ARSENIC/AA</u>	Arsenic	AS
<u>DIBROMOCHLOROPROPANE/GCECD</u>	Dibromochloropropane	DBCP
<u>HYDRAZINES/SPECT</u>		
Hydrazine	Hydrazine	HYD
Methylhydrazine	Methylhydrazine	HYDRZ
Unsymmetrical dimethyl hydrazine	Unsymmetrical dimethyl hydrazine	MHYDRZ
		UDMH
<u>MERCURY/AA</u>	Mercury	HG

APPENDIX 3-4-II-A (Continued)
Phase I

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
METALS/ICP		
Cadmium	Cadmium	ICP
Chromium	Chromium	CD
Copper	Copper	CR
Lead	Lead	CU
Zinc	Zinc	PB
ZN		
ORGANONITROGEN COMPOUNDS/GCNPD		
n-Nitrosodimethylamine	n-Nitrosodimethylamine	QNC
n-Nitrosodi-n-propylamine	n-Nitrosodi-n-propylamine	NNDMA
		NNDNPA
ORGANOPHOSPHOROUS COMPOUNDS/GCFPD		
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	OPC
Dimethylmethyl phosphonate	Dimethylmethyl phosphate	DIMP
		DMMP
SEMOVOLATILE ORGANIC COMPOUNDS/ GCMS		
1,4-Oxathiane	1,4-Oxathiane	SVO
2,2-bis(Para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	OXAT
2,2-bis(Para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloro- ethane	PPDDE
Aldrin	Aldrin	PPDDT
Atrazine	Atrazine	ALDRN
Chlordane	Chlordane	ATZ
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	CLDAN
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMS
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO2
Dibromochloropropane	Dibromochloropropane	CPMSO
Dicylopentadiene	Dicylopentadiene	DBCP
Dieldrin	Dieldrin	DCPD
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DLDRN
Dimethylmethyl phosphonate	Dimethylmethyl phosphonate	DIMP
Dithiane	Dithiane	DMMP*
Endrin	Endrin	DITH
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	ENDRN
Isodrin	Isodrin	CL6CP
Malathion	Malathion	ISODR
Parathion	Parathion	MLTHN
Supona	2-Chloro-1 (2,4-dichlorophenyl) vinyl diethyl phosphates	PRTHN
Vapona	Vapona	SUPONA
		DDVP

* DMMP is certified as part of the semivolatile organic compound method only for Hittman-Ebasco Laboratory.

APPENDIX 3-4-II-A (Continued)
Phase I

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
VOLATILE ORGANIC COMPOUNDS/ GCMS		
1,1-Dichloroethane	1,1-Dichloroethane	11DCLE
1,2-Dichloroethane	1,2-Dichloroethane	12DCLE
1,1,1-Trichloroethane	1,1,1-Trichloroethane	111TCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	112TCE
Benzene	Benzene	C6H6
Bicycloheptadiene	Bicycloheptadiene	BCHPD
Carbon tetrachloride	Carbon tetrachloride	CCL4
Chlorobenzene	Chlorobenzene	CLC6H5
Chloroform	Chloroform	CHCL3
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dimethyldisulfide	Dimethyldisulfide	DMDS
Ethylbenzene	Ethylbenzene	ETC6H5
m-Xylene	m-Xylene	13DMB
Methylene chloride	Methylene chloride	CH2CL2
Methylisobutyl ketone	Methylisobutyl ketone	MIBK
o- and p-Xylene	Ortho- & Para-xylene	XYLEN
Tetrachloroethylene	Tetrachloroethylene	TCLEE
Toluene	Toluene	MEC6H5
Trans-1,2-dichloroethylene	Trans-1,2-dichloroethylene	12DCE
Trichloroethylene	Trichloroethylene	TRCLE

APPENDIX 3-4-II-A
Phase II

PHASE II ANALYTES AND CERTIFIED METHODS
SOIL SAMPLES

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>AGENT PRODUCTS/HPLC</u> (Same as Phase I)		<u>IDG</u>
<u>AGENT PRODUCTS/IONCHROM</u> (Same as Phase I)		<u>GBDP</u>
<u>ANIONS/IONCHROM</u> (Same as Phase I)		<u>ANIONS</u>
<u>ARSENIC/AA</u>	Arsenic	<u>AS</u>
<u>DIBROMOCHLOROPROPANE/GC</u>	Dibromochloropropane	<u>DBCP</u>
<u>HYDRAZINES/SPECT</u> (Same as Phase I)		<u>HYD</u>
<u>MERCURY/AA</u>	Mercury	<u>HG</u>
<u>METALS/ICP</u> (Same as Phase I)		<u>ICP</u>
<u>ORGANOCHLORINE PESTICIDES/GCECD</u>		<u>OCP</u>
2,2-bis(Para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	<u>PPDDE</u>
2,2-bis(Para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloro- ethane	<u>PPDDT</u>
Aldrin	Aldrin	<u>ALDRN</u>
Chlordane	Chlordane	<u>CLDAN</u>
Dieldrin	Dieldrin	<u>DLLRN</u>
Endrin	Endrin	<u>ENDRN</u>
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	<u>CL6CP</u>
Isodrin	Isodrin	<u>ISODR</u>
<u>ORGANONITROGEN COMPOUNDS/GCNPD</u> (Same as Phase I)		<u>ONC</u>
<u>ORGANOPHOSPHOROUS COMPOUNDS/GCFPD</u> (Same as Phase I)		<u>OPC</u>

APPENDIX 3-4-II-A (Continued)
Phase II

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
ORGANOPHOSPHORUS PESTICIDES/ GCNPD		
Atrazine	Atrazine	OPP
Malathion	Malathion	ATZ
Parathion	Parathion	MLTHN
Supona	2-Chloro-1 (2,4-dichlorophenyl) vinyl diethyl phosphates	PRTHN
Vapona	Vapona	SUPONA
ORGANSULPHUR COMPOUNDS/GCFPD		
1,4-Oxathiane	1,4-Oxathiane	QSC
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	OXAT
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMS
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMS02
Dimethyldisulfide	Dimethyldisulfide	CPMSO
Dithiane	Dithiane	DMDS
		DITH
SEMOVOLATILE ORGANIC COMPOUNDS/ GCMS		
(Same as Phase I)		SVQ
VOLATILE AROMATIC ORGANIC COMPOUNDS/GCPID		
Benzene	Benzene	VAO
Ethylbenzene	Ethylbenzene	C6H6
m-Xylene	m-Xylene	ETC6H5
o- and p-Xylene	Ortho- & Para-xylene	13DMB
Toluene	Toluene	XYLEN
		MEC6H5
VOLATILE HALOGENATED ORGANIC COMPOUNDS/GCCON		
1,1-Dichloroethane	1,1-Dichloroethane	VHQ
1,2-Dichloroethane	1,2-Dichloroethane	11DCLE
1,1-Dichloroethene	1,1-Dichloroethene	12DCLE
1,1,1-Trichloroethane	1,1,1-Trichloroethane	11DCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	111TCE
Carbon tetrachloride	Carbon tetrachloride	112TCE
Chlorobenzene	Chlorobenzene	CCL4
Chloroform	Chloroform	CLC6H5
Methylene chloride	Methylene chloride	CHCL3
Tetrachloroethylene	Tetrachloroethylene	CH2CL2
Trans-1,2-dichloroethylene	Trans-1,2-dichloroethylene	TCLEE
Trichloroethylene	Trichloroethylene	T12DCE
		TRCLE

APPENDIX 3-4-II-A (Continued)
Phase II

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
VOLATILE HYDROCARBON COMPOUNDS/ GC/FID		
Bicycloheptadiene Dicyclopentadiene Methylisobutyl ketone	Bicycloheptadiene Dicyclopentadiene Methylisobutyl ketone	HYDCBN BCHPD DCPD MIBK
VOLATILE ORGANIC COMPOUNDS/GC/MS (Same as Phase I)		VO

Appendix 3- 4- II-B

Phase II Chemical Data

APPENDIX 3-4-II-B
Phase II Chemical Data

The analytical results of the laboratory analysis of soil samples collected as part of the program comprise the first part of Appendix 3-2/3-3-II-A. Data are listed sequentially by boring number and successive depths below the surface. Within each depth, all analytes for which the samples were tested are listed alphabetically. Results are given as less than (LT) the detection limit for the test laboratory, or as detected concentrations above this limit. Based on the accuracy of laboratory test methods, values for GC/MS volatile and GC/MS semivolatile compounds are considered accurate to one significant figure; values for analytes detected by all other methods used in this program are considered accurate to two significant figures.

The second part of Appendix 3-2/3-3-II-A contains data from the blanks associated with the analytical work. Blanks for the soil samples were based on a homogenized subsample of composited samples from a known uncontaminated soil that is stratigraphically similar to the RMA soils. Blanks for the water samples were based on distilled water. Control samples, or blanks, are introduced into the train of environmental samples to function as monitors on the performance of the analytical method. These samples function as quality control (QC) samples, and are an integral part of the quality assurance (QA) program for the project. The method blanks listed in this Appendix were utilized to verify that the laboratory was not a source of sample contamination. If contamination were detected in a method blank, corrective actions would have been taken to assure that reported concentrations of target analytes reflected sample analytes, and not analytes introduced by the laboratory process.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

03/20/88

Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Nemayon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0028	2-3	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,2-Dichloroethane	LT 8.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.50 -2	ug/g ug/g ug/g ug/g ug/g	DND005 DND005 DND005 DND005 DND005
		m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform		LT 2.60 -1 LT 8.50 -2 LT 1.20 -1 LT 3.70 0 LT 6.80 -2	ug/g ug/g ug/g ug/g ug/g	DNC005 DNC005 DNC005 DNC005 DNC005
		Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethane Tetrachloroethane		LT 2.00 -1 LT 1.60 -1 LT 1.90 -1 LT 2.60 -1 LT 2.70 -1	ug/g ug/g ug/g ug/g ug/g	DND005 DNC005 DNC005 DND005 DND005
		Trichloroethene Ortho- & para-Xylene		LT 1.40 -1 LT 3.90 -1	ug/g ug/g	DND005 DNC005
0028	4-5	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,2-Dichloroethane	LT 8.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.50 -2	ug/g ug/g ug/g ug/g ug/g	DND006 DND006 DND006 DND006 DND006
		m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform		LT 2.60 -1 LT 8.50 -2 LT 1.20 -1 LT 3.70 0 LT 6.80 -2	ug/g ug/g ug/g ug/g ug/g	DNC006 DNC006 DNC006 DNC006 DNC006
		Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethane Tetrachloroethane		LT 2.00 -1 LT 1.60 -1 LT 1.90 -1 LT 2.60 -1 LT 2.70 -1	ug/g ug/g ug/g ug/g ug/g	DND006 DNC006 DNC006 DND006 DND006
		Trichloroethene		LT 1.40 -1	ug/g	DND006

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program

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Task 20, Site 3-4,
Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0028	4-5	Soil	Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC006
0028	7-8	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,2-Dichloroethane	LT 8.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.50 -2	ug/g	DND007
			m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform	LT 2.60 -1 LT 8.50 -2 LT 1.20 -1 LT 3.70 0 LT 6.80 -2	ug/g	DNC007
			Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethene Tetrachloroethene	LT 2.00 -1 LT 1.60 -1 LT 1.90 -1 LT 2.60 -1 LT 2.70 -1	ug/g	DND007
			Trichloroethene Ortho- & Para-Xylene	LT 1.40 -1 LT 3.90 -1	ug/g	DND007
0029	2-3	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,2-Dichloroethane	LT 8.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.80 -2	ug/g	DND008
			m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform	LT 2.60 -1 LT 8.50 -2 LT 1.20 -1 LT 3.70 0 LT 6.80 -2	ug/g	DND008
			Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethene Tetrachloroethene	LT 2.00 -1 LT 1.60 -1 LT 1.90 -1 LT 2.60 -1 LT 2.70 -1	ug/g	DNC008

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
 Summary of Analytical Results

Rocky Mountain Arsenal Program
 Task 20, Site 3-4,
 Phase Two, Negotior Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0029	2-3	Soil	Trichloroethene Ortho- & Para-Xylene	LT 1.40 -1 LT 3.90 -1	ug/g ug/g	DND008 DNC008
0029	4-5	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,2-Dichloroethane	LT 8.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.50 -2	ug/g ug/g ug/g ug/g ug/g	DND009 DND009 DND009 DND009 DND009
			n-Xylene	LT 2.60 -1	ug/g	DNC009
			Benzene	LT 8.50 -2	ug/g	DNC009
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND009
			Methylene Chloride	LT 3.70 0	ug/g	DND009
			Chloroform	LT 6.80 -2	ug/g	DND009
			Chlorobenzene	LT 2.00 -1	ug/g	DND009
			Ethylbenzene	LT 1.60 -1	ug/g	DNC009
			Toluene	LT 1.90 -1	ug/g	DNC009
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND009
			Tetrachloroethane	LT 2.70 -1	ug/g	DND009
			Trichloroethene	LT 1.40 -1	ug/g	DND009
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC009
0029	7-8	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,2-Dichloroethane	LT 8.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.50 -2	ug/g ug/g ug/g ug/g ug/g	DND010 DND010 DND010 DND010 DND010
			n-Xylene	LT 2.60 -1	ug/g	DNC010
			Benzene	LT 8.50 -2	ug/g	DNC010
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND010
			Methylene Chloride	LT 3.70 0	ug/g	DND010
			Chloroform	LT 6.80 -2	ug/g	DND010
			Chlorobenzene	LT 2.00 -1	ug/g	DND010
			Ethylbenzene	LT 1.60 -1	ug/g	DNC010
			Toluene	LT 1.90 -1	ug/g	DNC010
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND010

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Summary of Analytical Results
Task 20, Site 3-4, Phase Two, Nemagon Spill AreaRocky Mountain Arsenal Program
09/20/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0029	7-8	Soil	Tetrachloroethene Trichloroethene Ortho- & Para-Xylene	LT 2.70 -1 LT 1.40 -1 LT 3.90 -1	ug/g ug/g ug/g	DND010 DND010 DNC010
0030	2-3	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,1-Dichloroethane 1,2-Dichloroethane	LT 0.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.50 -2	ug/g ug/g ug/g ug/g ug/g	DND011 DND011 DND011 DND011 DND011
			m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform	LT 2.60 -1 LT 8.50 -2 LT 1.20 -1 LT 3.70 0 LT 6.80 -2	ug/g ug/g ug/g ug/g ug/g	DNC011 DNC011 DND011 DND011 DND011
			Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethane Tetrachloroethene	LT 2.00 -1 LT 1.60 -1 LT 1.90 -1 LT 2.60 -1 LT 2.70 -1	ug/g ug/g ug/g ug/g ug/g	DND011 DNC011 DNC011 DND011 DND011
			Trichloroethene Ortho- & Para-Xylene	LT 1.40 -1 LT 3.90 -1	ug/g ug/g	DND011 DNC011
0030	4-5	Soil	1,1,1-Trichloroethane 1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene	LT 4.30 -1 LT 8.80 -2 LT 3.90 -1 LT 2.60 -1 LT 2.40 -1	ug/g ug/g ug/g ug/g ug/g	DNB002 DND012 DNB002 DND012 DND012
			1,1-Dichloroethane 1,1-Dichloroethane 1,2-Dichloroethane 1,2-Dichloroethane m-Xylene	LT 1.70 0 LT 7.40 -2 LT 5.60 -1 LT 8.50 -2 LT 7.40 -1	ug/g ug/g ug/g ug/g ug/g	DNB002 DND012 DNB002 DND012 DNB002
			m-Xylene Bicycloheptadiene Benzene	LT 2.60 -1 LT 3.60 -1 LT 2.50 -1	ug/g ug/g ug/g	DNC012 DNB002 DNB002

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
 Task 20, Site 3-4, Phase Two, Nemagon Spill Area
 09/20/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0030	4-5	Soil	Benzene Carbon Tetrachloride Carbon TetraChloride Methylene Chloride Methylene Chloride	LT 6.50 -2 LT 2.50 -1 LT 1.20 -1 LT 1.50 0 LT 3.70 0	ug/g ug/g ug/g ug/g ug/g	DNC012 DNB002 DND012 DNB002 DND012
			Chloroform Chloroform Chlorobenzene Chlorobenzene Dibromochloropropane	LT 2.90 -1 LT 6.80 -2 LT 1.50 0 LT 2.00 -1 LT 2.40 0	ug/g ug/g ug/g ug/g ug/g	DNB002 DND012 DNB002 DND012 DNB002
			Dicyclopentadiene Dimethyl Disulfide Ethylbenzene Ethylbenzene Toluene	LT 6.40 -1 LT 2.00 1 LT 3.80 -1 LT 1.60 -1 LT 2.50 -1	ug/g ug/g ug/g ug/g ug/g	DNC012 DNB002 DNB002 DNC012 DNB002
			Toluene Methylisobutyl Ketone Trans-1,2-Dichloroethane Trans-1,2-Dichloroethane Tetrachloroethene	LT 1.90 -1 LT 7.30 -1 LT 1.70 0 LT 2.60 -1 LT 2.50 -1	ug/g ug/g ug/g ug/g ug/g	DNC012 DNB002 DNB002 DND012 DNB002
			Tetrachloroethene Trichloroethene Trichloroethene Ortho- & Para-Xylene Ortho- & Para-Xylene	LT 2.70 -1 LT 5.40 -1 LT 1.40 -1 LT 4.90 0 LT 3.90 -1	ug/g ug/g ug/g ug/g ug/g	DND012 DNB002 DND012 DNB002 DNC012
0030	7-8	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,1-Dichloroethane 1,2-Dichloroethane m-Xylene Benzene Carbon Tetrachloride	LT 8.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.50 -2 LT 2.60 -1 LT 8.50 -2 LT 1.20 -1	ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g	DND013 DND013 DND013 DND013 DND013 DNC013 DNC013 DND013

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

09/20/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0030	7-8	Soil	Methylene Chloride Chloroform Chlorobenzene Ethylbenzene Toluene	LT 3.70 LT 6.80 LT 2.00 LT 1.60 LT 1.90	0 ug/g ug/g ug/g ug/g	DND013 DND013 DND013 DNC013 DNC013
			Trans-1,2-Dichloroethene Tetrachloroethene Trichloroethene Ortho- & Para-Xylene	LT 2.60 LT 2.70 LT 1.40 LT 3.90	-1 ug/g -1 ug/g	DND013 DND013 DND013 DNC013
0031	0-1	Soil	Dibromochloropropane	LT 1.30	0	ug/g
0031	4-5	Soil	Dibromochloropropane	LT 5.00	-3	ug/g
0032	0-1	Soil	Dibromochloropropane	LT 5.00	-3	ug/g
0032	4-5	Soil	Dibromochloropropane	LT 5.00	-3	ug/g
0033	0-1	Soil	Dibromochloropropane	LT 5.00	-3	ug/g
0033	4-5	Soil	Dibromochloropropane	LT 5.00	-3	ug/g
0034	0-1	Soil	Dibromochloropropane	LT 3.80	-1	ug/g
0034	4-5	Soil	Dibromochloropropane	LT 5.00	-3	ug/g
0035	0-1	Soil	Aldrin Atrazine Hexachlorocyclopentadiene Chlordane p-Chlorophenylmethyl Sulfide	LT 3.00 LT 3.00 LT 6.00 LT 2.00 LT 9.00	-1 ug/g -1 ug/g 0 -1	DMP002 DMP002 DMP002 DMP002 DMP002
			p-Chlorophenylmethyl Sulfoxide p-Chlorophenylmethyl Sulfone Dibromochloropropane Dicyclopentadiene Vapona	LT 3.00 LT 3.00 LT 1.00 LT 3.00	-1 ug/g -1 0 0	DMP002 DMP002 DMP002 DMP002
			Diisopropylmethyl Phosphonate	LT 1.00	0	ug/g

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

09/29/98

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0035	0-1	Soil	Dithiane Dieldrin Endrin Isodrin Malathion 1, 4-Oxathiane Dichlorodiphenylmethane Dichlorodiphenyltrichloro- ethane Parathion 2-Chloro-1(2, 4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 4.00 -1 LT 3.00 -1 LT 5.00 -1 LT 3.00 -1 LT 7.00 -1 LT 3.00 -1 LT 6.00 -1 LT 5.00 -1 LT 9.00 -1 LT 6.00 -1	ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g	DMP002 DMP002 DMP002 DMP002 DMP002 DMP002 DMP002 DMP002 DMP002 DMP002
0035	2-3	Soil	Aldrin Atrazine Hexachlorocyclopentadiene Chlordane p-Chlorophenylmethyl Sulfide p-Chlorophenylmethyl Sulfoxide p-Chlorophenylmethyl Sulfone Dibromochloropropane Dicyclopentadiene Vapona	LT 3.00 -1 LT 3.00 -1 LT 6.00 -1 LT 2.00 0 LT 9.00 -1 LT 3.00 -1 LT 3.00 -1 LT 3.00 -1 LT 1.00 0 LT 3.00 0	ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g	DMP003 DMP003 DMP003 DMP003 DMP003 DMP003 DMP003 DMP003 DMP003 DMP003
			Diisopropylmethyl Phosphonate Dithiane Dieldrin Endrin Isodrin Malathion 1, 4-Oxathiane Dichlorodiphenylmethane Dichlorodiphenyltrichloro- ethane Parathion	LT 1.00 0 LT 4.00 -1 LT 3.00 -1 LT 5.00 -1 LT 3.00 -1 LT 7.00 -1 LT 3.00 -1 LT 6.00 -1 LT 5.00 -1 LT 9.00 -1	ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g	DMP003 DMP003 DMP003 DMP003 DMP003 DMP003 DMP003 DMP003 DMP003 DMP003

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

Summary of Analytical Results Task #0, Site 3-4, Phase Two, Nematon Spill Area

09/20/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0035	2-3	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.00 -1	ug/g	DMP003
0036	0-1	Soil	Aldrin Atrazine Hexachlorocyclopentadiene Chlordane p-Chlorophenylmethyl Sulfide	LT 3.00 -1 LT 3.00 -1 LT 6.00 -1 LT 2.00 0 LT 9.00 -1	ug/g ug/g ug/g ug/g ug/g	DMP004 DMP004 DMP004 DMP004 DMP004
			p-Chlorophenylmethyl Sulfoxide p-Chlorophenylmethyl Sulfone Dibromochloropropane Dicyclopentadiene Vapona	LT 3.00 -1 LT 3.00 -1 LT 3.00 -1 LT 1.00 0 LT 3.00 0	ug/g ug/g ug/g ug/g ug/g	DMP004 DMP004 DMP004 DMP004 DMP004
			Diisopropylmethyl Phosphonate Dithiane Dieldrin Endrin Isodrin	LT 1.00 0 LT 4.00 -1 LT 3.00 -1 LT 5.00 -1 LT 3.00 -1	ug/g ug/g ug/g ug/g ug/g	DMP004 DMP004 DMP004 DMP004 DMP004
			Malathion 1,4-Oxathiane Dichlorodiphenylethane Dichlorodiphenyltrichloroethane Parathion	LT 7.00 -1 LT 3.00 -1 LT 6.00 -1 LT 5.00 -1 LT 9.00 -1	ug/g ug/g ug/g ug/g ug/g	DMP004 DMP004 DMP004 DMP004 DMP004
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.00 -1	ug/g	DMP004
0036	2-3	Soil	Aldrin Atrazine Hexachlorocyclopentadiene Chlordane p-Chlorophenylmethyl Sulfide	LT 3.00 -1 LT 3.00 -1 LT 6.00 -1 LT 2.00 0 LT 9.00 -1	ug/g ug/g ug/g ug/g ug/g	DMP005 DMP005 DMP005 DMP005 DMP005
			p-Chlorophenylmethyl Sulfoxide p-Chlorophenylmethyl Sulfone Dibromochloropropane	LT 3.00 -1 LT 3.00 -1 LT 3.00 -1	ug/g ug/g ug/g	DMP005 DMP005 DMP005

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Renovation Small Areas

03/20/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0036	2-3	Soil	Dicyclopentadiene Vapona Diisopropylmethyl Phosphonate Dithiane Dieldrin	LT 1.00 LT 3.00 LT 1.00 LT 4.00 LT 3.00	0 0 0 -1 -1	ug/g ug/g ug/g ug/g ug/g
			Endrin Isodrin Malathion 1,4-Oxathiane Dichlorodiphenylethane	LT 5.00 LT 3.00 LT 7.00 LT 3.00 LT 6.00	-1 -1 -1 -1 -1	ug/q ug/g ug/g ug/g ug/g
			Dichlorodiphenyltrichloro- ethane Parathion 2-Chloro-1(2,4-Dichlorophenyl)- Vinylidethyl Phosphates	LT 5.00 LT 9.00 LT 6.00	-1 -1 -1	ug/g ug/q ug/q
0037	0-1	Soil	Aldrin Atrazine Hexachlorocyclopentadiene Chlordane p-Chlorophenylmethyl Sulfide	LT 1.92 LT 3.00 LT 6.00 LT 2.00 LT 9.00	0 -1 -1 0 -1	ug/g ug/g ug/g ug/g ug/g
			p-Chlorophenylmethyl Sulfoxide p-Chlorophenylmethyl Sulfone Dibromochloropropane Dicyclopentadiene Vapona	LT 3.00 LT 3.00 LT 1.00 LT 3.00	-1 -1 0 0	ug/g ug/g ug/g ug/g
			Diisopropylmethyl Phosphonate Dithiane Dieldrin Endrin Isodrin	LT 1.00 LT 4.00 LT 7.43 LT 5.00 LT 3.00	0 -1 0 -1 -1	ug/g ug/g ug/g ug/g ug/g
			Malathion 1,4-Oxathiane Dichlorodiphenylethane Dichlorodiphenyltrichloro- ethane	LT 7.00 LT 3.00 LT 6.00 LT 5.00	-1 -1 -1 -1	ug/g ug/g ug/g ug/g

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

09/20/88

Rocky Mountain Arsenal Program

Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0037	0-1	Soil	Parathion 2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 9.00 -1 LT 6.00 -1	ug/g ug/g	DMP006 DMP006
0037	2-3	Soil	Aldrin Atrazine Hexachlorocyclopentadiene Chlordane p-Chlorophenylmethyl Sulfide p-Chlorophenylmethyl Sulfoxide p-Chlorophenylmethyl Sulfone Dibromochloropropane Dicyclopentadiene Vapona	LT 3.00 -1 LT 3.00 -1 LT 6.00 -1 LT 2.00 0 LT 9.00 -1 LT 3.00 -1 LT 3.00 -1 LT 3.00 -1 LT 1.00 0 LT 3.00 0	ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g ug/g	DMP007 DMP007 DMP007 DMP007 DMP007 DMP007 DMP007 DMP007 DMP007 DMP007 DMP007
			Diisopropylmethyl Phosphonate Dithiane Dieルドrin Endrin Isodrin	LT 1.00 0 LT 4.00 -1 LT 4.59 -1 LT 5.00 -1 LT 3.00 -1	ug/g ug/g ug/g ug/g ug/g	DMP007 DMP007 DMP007 DMP007 DMP007
			Malathion 1,4-Oxathiane Dichlorodiphenylmethane Dichlorodiphenyltrichloroethane Parathion	LT 7.00 -1 LT 3.00 -1 LT 6.00 -1 LT 5.00 -1 LT 9.00 -1	ug/g ug/g ug/g ug/g ug/g	DMP007 DMP007 DMP007 DMP007 DMP007
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.00 -1	ug/g	DMP007

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 20
Phase II, Site 3-4, Nemagon Spill Area

09/20/68

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Dibromochloropropane	LT 5.00 -3	ug/g	DMP001
Blank	Aldrin	LT 3.00 -1	ug/g	DMP001
Blank	Atrazine	LT 3.00 -1	ug/g	DMP001
Blank	Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP001
Blank	Chlordane	LT 2.00 0	ug/g	DMP001
Blank	p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP001
Blank	p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP001
Blank	Dibromochloropropane	LT 3.00 -1	ug/g	DMP001
Blank	Dicyclopentadiene	LT 1.00 0	ug/g	DMP001
Blank	Vapona	LT 3.00 0	ug/g	DMP001
Blank	Diisopropylmethyl Phosphonate	LT 1.00 0	ug/g	DMP001
Blank	Dithiane	LT 4.00 -1	ug/g	DMP001
Blank	Dieldrin	LT 3.00 -1	ug/g	DMP001
Blank	Endrin	LT 5.00 -1	ug/g	DMP001
Blank	Isodrin	LT 3.00 -1	ug/g	DMP001
Blank	Malathion	LT 7.00 -1	ug/g	DMP001
Blank	1, 4-Oxathiane	LT 3.00 -1	ug/g	DMP001
Blank	Dichlorodiphenylmethane	LT 6.00 -1	ug/g	DMP001
Blank	Dichlorodiphenyltrichloroethane	LT 5.00 -1	ug/g	DMP001
Blank	Parathion	LT 9.00 -1	ug/g	DMP001
Blank	2-Chloro-1(2, 4-Dichlorophenyl) Vinyldiethyl Phosphates	LT 6.00 -1	ug/g	DMP001
Blank	1, 1, 1-Trichloroethane	LT 4.30 -1	ug/g	DNB001
Blank	1, 1, 2-Trichloroethane	LT 3.90 -1	ug/g	DNB001
Blank	1, 1-Dichloroethane	LT 1.70 0	ug/g	DNB001
Blank	Trans-1, 2-Dichloroethene	LT 1.70 0	ug/g	DNB001
Blank	1, 2-Dichloroethane	LT 5.60 -1	ug/g	DNB001
Blank	m-Xylene	LT 7.40 -1	ug/g	DNR001
Blank	Bicycloheptadiene	LT 3.60 -1	ug/g	DNB001
Blank	Benzene	LT 2.50 -1	ug/g	DNB001
Blank	Carbon Tetrachloride	LT 2.50 -1	ug/g	DNB001
Blank	Methylene Chloride	LT 4.58 0	ug/g	DNB001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

Summary of Analytical Results

Blanks Associated with Task 20
Phase II, Site 3-4, Nemagon Spill Area

03/20/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Chloroform	LT 2.30 -1	ug/g	DNB001
Blank	Chlorobenzene	LT 1.50 0	ug/g	DNB001
Blank	Dibromochloropropane	LT 2.40 0	ug/g	DNB001
Blank	Dicyclopentadiene	LT 6.40 -1	ug/g	DNB001
Blank	Dimethyl disulfide	LT 2.00 1	ug/g	DNB001
Blank	Ethylibenzene	LT 3.80 -1	ug/g	DNE001
Blank	Toluene	LT 2.50 -1	ug/g	DNE001
Blank	Methylisobutyl Ketone	LT 7.30 -1	ug/g	DNB001
Blank	Tetrachloroethene	LT 2.50 -1	ug/g	DNB001
Blank	Trichloroethene	LT 5.40 -1	ug/g	DNB001
Blank	Ortho- & Para-Xylene	LT 4.90 0	ug/g	DNB001
Blank	m-Xylene	LT 2.60 -1	ug/g	DNC001
Blank	Benzene	LT 8.50 -2	ug/g	DNC001
Blank	Ethylbenzene	LT 1.60 -1	ug/g	DNC001
Blank	Toluene	LT 1.90 -1	ug/g	DNC001
Blank	Ortho- & Para-Xylene	LT 3.30 -1	ug/g	DNC001
Blank	1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND001
Blank	1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND001
Blank	1,1-Dichloroethene	LT 2.40 -1	ug/g	DND001
Blank	1,1-Dichloroethane	LT 7.40 -2	ug/g	DND001
Blank	Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND001
Blank	1,2-Dichloroethane	LT 8.50 -2	ug/g	DND001
Blank	Carbon Tetrachloride	LT 1.20 -1	ug/g	DND001
Blank	Methylene Chloride	LT 3.70 0	ug/g	DND001
Blank	Chloroform	LT 6.80 -2	ug/g	DND001
Blank	Chlorobenzene	LT 2.00 -1	ug/g	DND001
Blank	Tetrachloroethene	LT 2.70 -1	ug/g	DND001
Blank	Trichloroethene	LT 1.40 -1	ug/g	DND001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.